FACTSHEET

EMF-RAPID PROGRAM: THE POSSIBLE EFFECTS OF POWER-LINE FREQUENCY ELECTRIC AND MAGNETIC FIELDS ON HUMAN HEALTH

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National Toxicology Program

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Associated with the generation, transmission, or use of electric power is the production of weak electric and magnetic fields (EMF) that oscillate at 60 cycles per second (Hz). EMFs with cycle frequencies of greater than 3 Hz and less that 3000 Hz are generally referred to as extremely low frequency (ELF) EMF.

In response to public concern about whether ELF-EMF exposure might be adverse to human health, the U.S. Congress mandated the Electric and Magnetic Fields Research and Public Information Dissemination Program (EMF-RAPID Program) in the 1992 Energy Policy Act (Public Law 102-486, Section 2118). This six-year effort, funded jointly by Federal and matching private funds, was designed to determine the potential effect on biological systems of exposure to 60 Hz ELF-EMF, especially those produced by the generation, transmission or use of electric energy. The EMF-RAPID Program had three basic components: 1) a research program, 2) information compilation and public outreach, and 3) a health assessment for evaluation of any potential hazards arising from exposure to ELF-EMF. The National Institute of Environmental Health Sciences (NIEHS) of the National Institutes of Health was directed to oversee the health effects research and hazard evaluation, and the U.S. Department of Energy was responsible for engineering research aimed at characterizing and mitigating these fields. The Program ended December 31, 1998, and the NIEHS Director submitted a report to the Congress on June 15, 1999 outlining the possible human health risks associated with ELF-EMF exposure.

The NIEHS followed a three-tiered strategy for collection and evaluation of the scientific information on ELF-EMF that was designed to be open, objective, scholarly and included three science review symposia, a working group meeting, and solicitation of pubic comments. Research scientists, Federal and state agencies, and public interest and stakeholder groups were included at all levels of the process. The NIEHS sought advice on identification of key research findings, the quality of the research, and the strength of the evidence for human health and biological effects from ELF-EMF exposures. The NIEHS also hosted four pubic meetings and solicited written comments from the public and interested parties on ELF-EMF.

In preparation of the Report, the NIEHS reviewed and evaluated all meeting reports and their recommendations as well as the oral and written comments. The NIEHS concluded that ELF-EMF cannot be recognized at this time as entirely safe because of weak scientific evidence that exposure may pose a leukemia hazard. The strongest evidence for health effects comes from associations observed in human populations with two forms of cancer, childhood leukemia and chronic lymphocytic leukemia in occupationally exposed adults. In contrast, the mechanistic studies and the animal toxicology literature fail to demonstrate any consistent pattern across studies. Because virtually everyone in the United States uses electricity and therefore is routinely exposed to ELF-EMF, passive regulatory action is warranted such as a continued emphasis on educating the public and the regulated community on means aimed at reducing exposures. No other cancers or non-cancer health outcomes provided sufficient evidence of a risk to currently warrant concern.

For additional information or documents from the EMF-RAPID Program visit its web-site, http://www.niehs.nih.gov/emfrapid/home.htm *or contact Central Data Management, NIEHS, P.O. Box 12233, MD E1-02, Research Triangle Park, NC 27709*

Visit the NTP Home Page at http://ntp-server.niehs.nih.gov

Selected Reading

1. Portier CJ, Wolfe MS, eds. EMF science review symposium breakout group report for theoretical mechanisms and in vitro research findings. National Institute of Environmental Health Sciences, Research Triangle Park, North Carolina, 1997.

2. Portier CJ, Wolfe MS. Assessment of health effects from exposure to power-line frequency electric and magnetic fields. Research Triangle Park, North Carolina: National Institute of Environmental Health Sciences, 1998; NIH publication no. 98-3981.

3. Portier CJ, Wolfe MS. EMF Science Review Symposium breakout group report for epidemiology research findings. National Institute of Environmental Health Sciences, Research Triangle Park, North Carolina, 1998.

4. Portier CJ, Wolfe MS. EMF Science Review Symposium breakout group report for clinical and in vivo laboratory findings. Research Triangle Park, North Carolina: National Institute of Environmental Health Sciences, 1998; NIH publication no. 98-4400.

5. Portier CJ, Wolfe MS, Boorman GA, Bernheim NJ, Galvin MJ, Newton SA, Parham FM, Olden KO, eds. NIEHS report on health effects from exposure to power-line frequency electric and magnetic fields. Research Triangle Park, North Carolina: National Institute of Environmental Health Sciences; NIH publication no. 99-4493. 1999;508.